IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of

PULLINI et al — Atty. Ref.: 4636-16

Serial No. 10534389 (Conf. No. 2833) — TC/A.U.: 2889

Filed: May 9, 2005 — Examiner: Fatima N. Farokhrooz

For: HIGH EFFICIENCY EMITTER FOR INCANDESCENT LIGHT SOURCES

* *

March 15, 2010

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Appellant hereby appeals to the Board of Patent Appeals and Interferences from the last decision of the Examiner.

A three month extension of time is requested, and the fee is being paid herewith.

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Account No. 14-1140.

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03/16/2010 MAHMED1 00000015 10534389
02 FC:1402 540.00 OP

(I) REAL PARTY IN INTEREST

The real party in interest is C.R.F. SOCIETA CONSORTILE PER AZIONI, an Italian company. This well respected research company is part of the Fiat Group of companies.

(II) STATEMENT OF RELATED CASES

The appellant, the undersigned, and the assignee are not aware of any related appeals, interferences, or judicial proceedings (past or present), which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(III) JURISDICTIONAL STATEMENT

The Board has jurisdiction under 35 U.S.C. § 134(a).

On June 10, 2009, the Examiner mailed a Final Office Action with two rejections.

On September 10, 2009, applicant filed an Amendment/Response After Final - without any claim amendments.

On September 29, 2009, the Examiner mailed an Advisory Action that entered the Amendment/Response After Final and maintained the two rejections of the Final Office Action.

On October 13, 2009, applicant filed a Notice of Appeal of the two rejections.

(IV) TABLE OF CONTENTS

(V) TABLE OF AUTHORITIES

Not applicable

(VI) STATUS OF AMENDMENTS

All claim amendments filed prior to the Final Office Action of June 10, 2009, have been entered. No claim amendments were submitted after the Final Office Action; although, applicant did submit an Amendment/Response After Final on September 10, 2009 (without any claim amendments), which was entered and acted upon by the Examiner as set forth in the Advisory Action of September 29, 2009.

(VII) GROUNDS OF REJECTION TO BE REVIEWED

1. Are claims 29-41, 43-46, 48-54, and 59-60 properly rejected under 35 U.S.C. 103(a) as allegedly being obvious over Levinson (USP 5152870), Wuest (USP 5416376), Richard (GB 2032173), Munroe (USP 4499398), and Ooms (USP 3956660)?

2. Is dependent claim 47 properly rejected under 35 U.S.C. 103(a) as allegedly being obvious over Levinson (USP 5152870), Wuest (USP 5416376), Richard (GB 2032173), Munroe (USP 4499398), Ooms (USP 3956660), and Gee (US Patent Application Publication 20030132705)?

These two grounds of rejection have been treated similarly below because:

a. they both concern the same five (5) references plus a sixth (6^{th}) reference applied to claim 47, and

b. claim 47 directly depends from independent claim 29 – which is at the heart of the appeal.

(VIII) SUMMARY OF CLAIMED SUBJECT MATTER

There are three independent claims: 29, 51, and 60. The easiest way to summarize the claims is to parse them in the following manner.

29. An incandescence emitter for incandescence light sources (page 4, line 30), comprising

an emitter body (F) (page 9, line 2 through page 10, line 28; Figs 3-6 and 11-15)

to be brought to incandescence at an operating temperature by means of passage of electric current (page 5, lines 6-17),

the emitter body (F) extending between two electrodes (H) (page 16, lines 17-20; Figs 11-15),

wherein on at least one surface of the emitter body (F) a micro-structure (R) is provided (page 7, lines 14-35; Figs 3-6 and 11-15),

operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum (page 15, line 32 to page 16, line 16; Figs 7-10),

wherein

- said micro-structure (R) is at least partly made of a first material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F) (page 15, line 32 to page 17, line 13; Figs 7-12),

- said electrodes (H) are made of a second material having a high melting point, such as tungsten (page 16, lines 30-32; Figs 11-12),

- at least a substantial portion of the emitter body (F), including said micro-structure (R), is coated with a coating layer (OR) made of an oxide with high melting point, such as a refractory oxide, said oxide being configured to preserve a profile of said microstructure (R) in case of melting of the first material (Au), consequent to the use of the emitter body (F) at an operating temperature exceeding the melting temperature of said first material (Au) (page 15, line 16 to page 17, line 21; Figs 7-12), and

wherein at least one of said emitter body (F), said electrodes (H) and said coating layer (OR) includes one throat or cavity (G) being open on the first material (Au) for receiving part of said first material (Au) in case of melting thereof (page 17, lines 22-33; Figs 11-12).

51. A method for constructing an incandescence light emitter to be brought to incandescence by passage of electric current (page 4, line 30; page 5, lines 6-17; page 9, line 2 through page 10, line 28; Figs 3-6 and 11-15),

comprising the steps of:

a) obtaining a filiform or laminar emitter body (F) to be brought to incandescence at an operating temperature by means of passage of electric current, the emitter body (F) being formed to have on at least one surface thereof a micro-structure (R) operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum, said micro-structure (R) being at least partly made of a first material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F) (page 4, line 30; page 5, lines 6-17; page 9, line 2 through page 10, line 28; page 7, lines 14-35; page 15, line 32 to page 17, line 13; Figs 3-15),

b) obtaining a first and a second electrode (H), said electrodes (H) being made of a second material having a high melting point, such as tungsten (page 16, lines 30-32; Figs 11-12),

c) connecting each electrode (H) to the emitter body (F) (page 16, lines 17-20; Figs 11-15), and

d) coating the emitter body (F) in which the anti-reflection micro-structure (R) has been formed with a coating layer (OR) of refractory oxide, said coating layer (OR) being operative to preserve a profile of said microstructure (R) in case of melting of the material (Au) thereof, consequent to the use of the emitter (F) at an operating temperature exceeding the melting temperature of said material (Au) (page 15, line 16 to page 17, line 21; Figs 7-12),

the method including forming in at least one of said emitter body (F), said electrodes (H) and said coating layer (OR) one throat or cavity (G) open on the first material (Au) (page 17, lines 22-33; Figs 11-12).

60. An incandescence emitter for incandescence light sources, comprising an emitter body (F) to be brought to incandescence at an operating temperature by means of passage of electric current (page 4, line 30; page 5, lines 6-17; page 9, line 2 through page 10, line 28; Figs 3-6 and 11-15),

wherein on at least one surface of the emitter body (F) a micro-structure (R) is provided (page 7, lines 14-35; Figs 3-6 and 11-15),

operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum (page 15, line 32 to page 16, line 16; Figs 7-10),

wherein

- said micro-structure (R) is at least partly made of a material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F) (page 15, line 32 to page 17, line 13; Figs 7-12), and

- at least a substantial portion of the emitter body (F), including said micro-structure (R), is coated with an oxide with high melting point (OR), such as a refractory oxide (page 15, line 16 to page 17, line 21; Figs 7-12),

said oxide being configured to preserve a profile of said microstructure (R) in case of melting of the respective material (Au), consequent to the use of the emitter body (F) at an operating temperature exceeding the melting temperature of said material (Au) (page 15, line 16 to page 17, line 21; Figs 7-12).

Finally, applicant notes that there are no means-plus-function elements in the claims.

(IX) ARGUMENT

Claims 29-41, 43-54, and 59-60 are pending in this application. The other claims have been cancelled without prejudice.

A. Claims 29-41, 43-46, 48-54, and 59-60 are patentable over any reasonably apparent combination of Levinson (USP 5152870), Wuest (USP 5416376), Richard (GB 2032173), Munroe (USP 4499398), and Ooms (USP 3956660).

On pages 2-15 of the Final Office Action, claims 29-41, 43-46, 48-54, and 59-60 stand rejected as allegedly being obvious over Levinson (USP 5152870), Wuest (USP 5416376), Richard (GB 2032173), Munroe (USP 4499398), and Ooms (USP 3956660). Applicant requests reversal of the rejection for at least the following reasons – which apply to each of the independent claims 29, 51, and 60, as well as all dependent claims.

In summary at the outset, applicant respectfully submits that the rejection is deficient because:

i) it is based on incorrect technical statements or assumptions,

ii) it is based on hindsight reasoning,

iii) it is based on a large number of relatively old references (five) – the shear number of which demonstrates that the claimed invention is not obvious, and

iv) it does not set forth a prima facie case of obviousness.

A person skilled in the art would not combine the correctly interpreted teachings of the five references in any reasonably apparent fashion and arrive at the claimed invention.

For this rejection, it may be easiest for the Board to focus on claim 29 and the underlined elements below that are also applicable to the other independent claims and dependent claims that have been rejected (although claim 60 does not include the particular throat/cavity feature).

29. An incandescence emitter for incandescence light sources, comprising

an emitter body (F) to be brought to incandescence at an operating temperature by means of passage of electric current (page 5, lines 6-17),

the emitter body (F) extending between two electrodes (H),

wherein on at least one surface of the emitter body (F) a micro-structure (R) is provided, operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum,

wherein

- said micro-structure (R) is at least partly made of a first material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F),

- said electrodes (H) are made of a second material having a high melting point, such as tungsten,

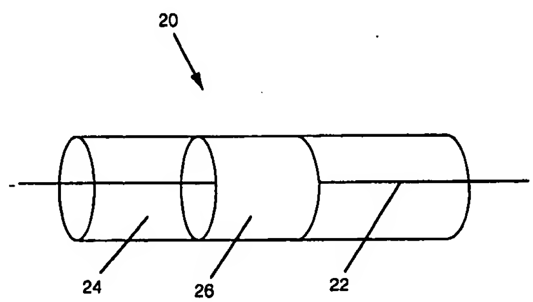
- at least a substantial portion of the emitter body (F), including said micro-structure (R), is coated with a coating layer (OR) made of an oxide with high melting point, such as a refractory oxide, said oxide being configured to preserve a profile of said microstructure (R) in case of melting of the first material (Au), consequent to the use of the emitter body (F) at an operating temperature exceeding the melting temperature of said first material (Au), and

wherein at least one of said emitter body (F), said electrodes (H) and said coating layer (OR) includes one throat or cavity (G) being open on the first material (Au) for receiving part of said first material (Au) in case of melting thereof.

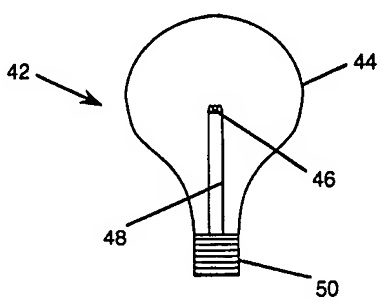
In applicant's prior responses filed during examination (in which all rejections were correctly withdrawn by the Examiner), Levinson and Richard were analyzed and shown to be deficient for various reasons. Briefly, Levinson discloses a process for manufacturing filaments for incandescent lamps having an increased radiation efficiency. The Levinson process is employed for structuring the surface of tungsten filaments, where tungsten has a high melting point. Richard discloses an incandescent lamp wherein a filament made of carbon or a refractory metal (i.e., having a high melting point) is embedded within a refractory oxide, in order to suppress evaporation of the material constituting the emitter. Significantly, none of the materials used in Levinson and Richard runs the risk of melting at the operating temperature of the emitter. Thus, these old patents are quite different than the claimed invention and its objectives. The

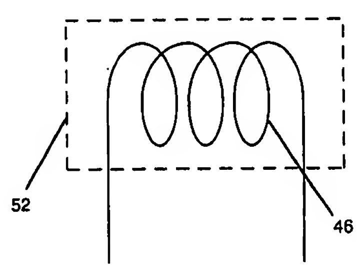
other references do not overcome these deficiencies in features and objectives (which is highly relevant to why a person skilled in the art would not combine the cited references in any reasonably apparent fashion in order to arrive at the claimed invention).

More specifically, the Wuest reference relates to devices in which a filament 22 is embedded in an aerogel structure 24.



Wuest essentially refers to devices for measuring ionizing radiation, i.e., ionization counters, by detecting the amount of charge liberated by the interaction of ionizing radiation with suitable gases, liquids, or solids. Wuest also mentions the possible use of an aerogel structure 52 for protecting from vibration the filament 46 of an incandescent lamp 42.





The final rejection contends that Wuest would suggest the combined use of tungsten and gold for making incandescence light emitters. This is incorrect and is no where found in the reference. In alleged support of the rejection's incorrect contention, the final rejection refers in particular to column 5, lines 10-21 of Wuest, wherein a gold-plated tungsten wire is mentioned.

However, it is significant to note that this Wuest passage relates to a part of the disclosure concerning a device for measuring ionizing radiation, i.e., an ionization counter, which has nothing in common with a light source. Also, the introductory part of Wuest makes clear, when explaining the operation and structures of typical ionization counters, that devices of this kind use anode wires made of gold-plated tungsten (see column 1, lines 16-56, in particular lines 48-49). Thus, the rejection's premise is incorrect and reveals improper hindsight usage of non-analogous disclosures in order to allegedly arrive at a feature of the claimed invention.

In fact, the part of the Wuest disclosure relating to an incandescent lamp (starting from column 5, line 47) only mentions **tungsten** as a material for forming the filament (column 6, lines 6-12). Tungsten and tungsten alloys are also mentioned in Wuest's claim 13. It is well known that common incandescent lamps have filaments made of tungsten or tungsten alloys. This common knowledge does not lead to the claimed invention.

In summary, it is immediately apparent from the overall disclosure of Wuest that, in the case of an incandescent lamp, the aerogel structure is combined with a traditional filament – in contrast to the claimed invention that does not employ a traditional filament. As a result, the correct facts show that Wuest teaches away from the claimed invention, which means that there is no prima facie case of obviousness.

Moreover, it must be noted that aerogels are highly porous structures. See Wuest at column 2, lines 25-28. For this reason, one skilled in the art would never consider using the aerogel structure of Wuest with a gold plated filament. Indeed, if the filament 46 of the lamp 42 of Wuest were effectively gold plated, then, at the typical operating temperature of any incandescent lamp, gold would melt and disperse within the pores of the aerogel structure 52 – thereby destroying the Wuest device. This is further evidence that Wuest teaches away from the

claimed invention and that there is no prima facie case of obviousness.

For at least the foregoing reasons, Wuest does not disclose or even remotely suggest the particularly claimed use of a gold plated tungsten filament for a lamp.

The final rejection also states that one skilled in the art would be inclined to modify the emitter material, as disclosed by Wuest, in the device of Levinson ***in order to improve corrosion and oxidation resistance of the base element of tungsten*** (page 3 of the Office Action, emphasis added). This motivation is completely erroneous from a technical viewpoint, if one considers that the glass bulb of all incandescent lamp is already filled with an inert gas (such as argon or nitrogen) exactly for the above purpose, i.e., avoiding oxidation and corrosion of the filament (in the past, a void was formed for this purpose in the bulb). .

Applicant assumes that the rejection was possibly basing the above-mentioned motivation (gold plated over tungsten to achieve corrosion resistance in high temperature) on the document mentioned in the section "*Prior Art*" of the Final Office Action, i.e., US 4393817 (Lindberg). If applicant's assumption is right, then the Office Action is comparing different fields that have no real relationships, when considering the involved temperatures. Again, this is evidence of improper hindsight reasoning.

In this regard, Lindberg relates to a combustion and pollution control system for an internal combustion engine - which has nothing to do with incandescent lamps. One of the embodiments of Lindberg provides for a boiler 306 (Figs. 53-54) installed in the exhaust pipe 308 of the motor, to produce superheated steam starting from water contained in a tank 304, which steam is brought to the motor through a conduit 314.

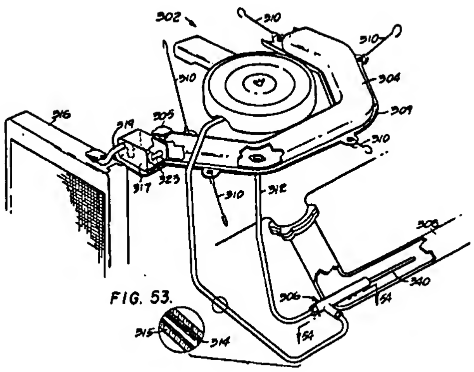


FIG. 53.

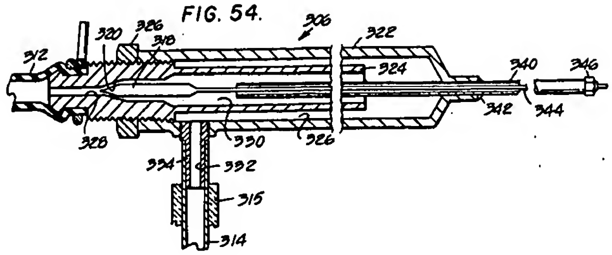


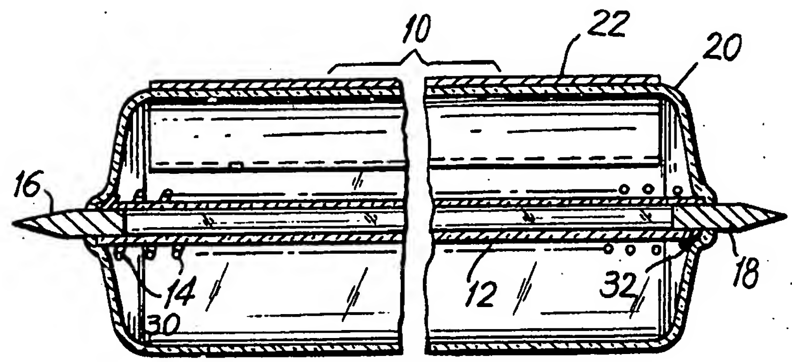
FIG. 54.

The steam flow is controlled by means of a valve device which is integrated in the boiler 306, this device including a valve element 318 operating at a valve seat 320. The valve element 318 is actuated through a tungsten wire 344, having a coefficient of thermal expansion lower than the coefficient of thermal expansion of the steel forming a tube 340, within which the tungsten wire 344 is housed and fixed at an end thereof, the steel tube 340 extending within the exhaust pipe 308. It is in this part of the disclosure (column 42, from line 58) that Lindberg states that the tungsten wire 344 can be protected against corrosion by coating it with gold, for instance.

It is more than evident that the temperatures of the water or the steam with which the wire 344 can be in contact is <u>not comparable</u> with the operating temperature (such as 1900-2800K) of a filament for an incandescent lamp as in the applicant's claimed invention. If the temperature involved in Lindberg were the same as in the subject application, <u>it would be completely useless to coat the wire 344 of Lindberg with gold</u> because the gold coating would melt and thus any protection against corrosion would be lost (gold melts at about 1340K).

In summary, if the final rejection's reasoning concerning Wuest is based on the teaching of Lindberg (that gold plated over tungsten achieves corrosion resistance), then this would be another technical error.

Turning now to the Munroe reference, Munroe relates to an incandescent lamp having a special structure, distinguished by an inner ceramic support 12 to allow use of a "stronger" filament 14, by a sharp shape of the connection electrodes 16, 18 and by an outer reflecting screen 22.



Munroe was cited in the final rejection because it allegedly suggests the claimed incandescence emitter extending between two electrodes.

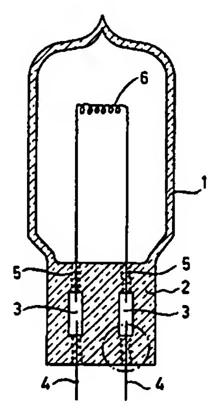
Applicant's independent claims 29 and 51 require an emitter body (F) provided with a micro-structure (R) made of a first material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F), and electrodes made of a second material having a high melting point. Independent claim 60 requires an emitter body (F) provided with a micro-structure (R) made of a first material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F). There is no teaching in Munroe (or the other cited documents) of these features. This further confirms that there is no prima facie case of obviousness.

The cited art also fails to disclose or suggest the inventions of independent claims 29 and 51 that require one of the emitter body, the electrodes, and the coating layer includes one throat or cavity being open on the nano-structure second material which covers the filament (claim 29), or this throat or cavity is formed in one of the emitter body, the electrodes, and the coating layer

(claim 51).

According to the final rejection, Ooms allegedly discloses or suggests the foregoing features. According to the final rejection, Ooms allegedly suggests to one skilled in the art "*to add the cavity as disclosed by Ooms to at least the emitter body, the electrode or the coating layer ....in order that the melting metal from the emitter material can flow in the cavity* ***at the end of the life of the lamp***" (page 5 of the Final Office Action, emphasis added). Applicant requests that the Board keep in mind the underlined phrase – "at the end of the life of the lamp" – which is quite different than the claimed invention that concerns assuring correct operation of the lamp during normal operating temperature of the filament.

Ooms relates to halogen lamps whose bulb has a pinch seal which, according to the introductory part of the disclosure, would be subjected to explosion **at the end of the life of the lamp,** when the filament breaks. In the lamps of the indicated type, the pinch seal includes two molybdenum foils. When the filament breaks, the foils melt and expand in volume, thus causing the bulb explosion (see column 1, lines 15-40).



To overcome this problem, Ooms proposes to provide an "escape path" for the molybdenum, when it melts. In particular, Ooms proposes **providing the pinch seal** with means that form a cavity which adjoins the point of the weld of the molybdenum foils to at least one of

the outer conductors of the lamp (see column 1, lines 34-40).

In one embodiment (Figs. 1-2), each conductor 4 of the lamp connected to the molybdenum foil 3 is surrounded by a wire 7 wound in a spiral, being in contact with the foil. In this way, between the conductor 4 and the wire 7, an escape gap is defined, where the molybdenum can flow. Similarly, in a second embodiment (Fig. 3), the conductor is surrounded by a glass tube 23, performing the functions of the above mentioned wire wound in spiral. In a third embodiment (Figs. 4-5), the outer conductors 16 of a tubular lamp have axial grooves 19, allowing molybdenum to escape.

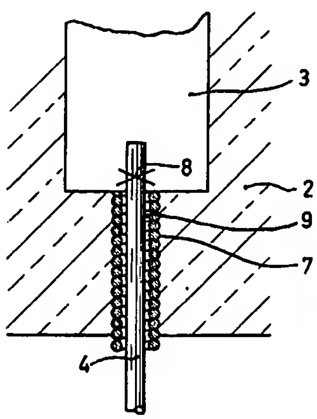


Fig.2

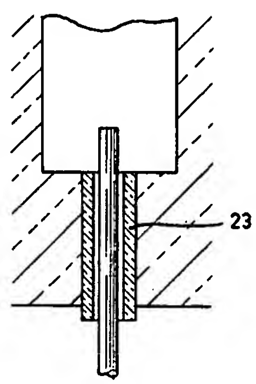


Fig.3

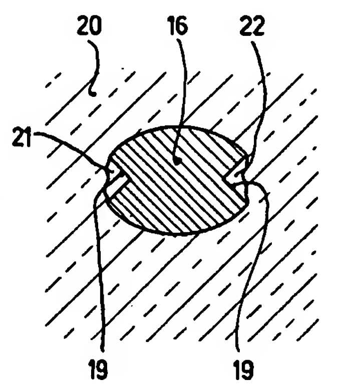


Fig.5

Applicant notes the following significant points.

First, the design of Ooms is specifically provided for avoiding explosion of the halogen lamp bulb **<u>at the end of the life of the lamp</u>**, i.e., when the filament thereof breaks. This is a first substantial difference with respect to the claimed invention, wherein throats or grooves are provided <u>for assuring correct operation of the incandescent lamp during normal operating temperature of the filament</u>. In the claimed invention, at the normal operating temperature of the

filament, the material forming the surface nano-structure changes the state thereof, i.e., it melts, but this does not entail the "death" of the lamp.

Second, the molybdenum foil of Ooms and the "escape means" thereof are specifically integrated within the pinch seal, i.e., a region of the halogen lamp which is spatially separated and spaced apart from the filament, which pinch region is insulated with respect to the inside of the bulb. In contrast, in the applicant's invention, the low melting-point material covers the filament and is directly in contact with the emitter material, the coating layer, and the electrodes.

Significantly, the invention of independent claims 29 and 51 requires that one of the emitter body, the electrodes, and the coating layer includes one throat or cavity being open on the nano-structure second material which covers the filament (claim 29) or this throat or cavity is formed in one of the emitter body, the electrodes, and the coating layer (claim 51). This is not the case of Ooms, when considering the embodiments of figures 1-2 and 3, wherein a cavity is formed by a spiral wire or a glass tube extending in the pinch seal. It is also immediately apparent that the Ooms embodiment of figures 4 and 5 has nothing to share with the claimed invention, i.e., only conductors 16 are provided with grooves, but these conductors extend within the pinch seal region (see figure 4 and the cross section of figure 5).

For at least the foregoing reasons, the five cited references do not provide a prima facie case of obviousness. One skilled in the art would have no reasonable motivation to combine bits and pieces of the five cited references and, in any event, would never arrive at the claimed invention. Accordingly, applicant requests the reversal of the rejection of claims 29-41, 43-46, 48-54 and 59-60.

B. Claim 47 is patentable over any reasonably apparent combination of Levinson (USP 5152870), Wuest (USP 5416376), Richard (GB 2032173), Munroe (USP 4499398), Ooms (USP 3956660), and Gee (US Patent Application Publication 20030132705).

On pages 15-16 of the Final Office Action, claim 47 stands rejected as allegedly being obvious over Levinson (USP 5152870), Wuest (USP 5416376), Richard (GB 2032173), Munroe (USP 4499398), Ooms (USP 3956660), and Gee (US Patent Application Publication 20030132705). This rejection includes the same five references discussed above plus the Gee reference. Applicant requests reversal of the rejection.

Claim 47 depends from independent claim 29; thus, all of the foregoing arguments concerning the first five references and claim 29 apply to the rejection of claim 47. The additional Gee reference does not overcome the deficiencies of the five references discussed above. Gee was simply cited in the Final Office Action because of its alleged disclosure and objective of stacked tungsten rods – which certainly does not overcome the deficiencies of the five references noted above.

For at least the foregoing reasons, the six cited references do not provide a prima facie case of obviousness of claim 47. One skilled in the art would have no reasonable motivation to combine the six cited references and would never arrive at the invention of claim 47. Accordingly, applicant requests the reversal of the rejection.

CONCLUSION

Applicant respectfully requests the Board to reverse the final rejections and pass the subject application to issue.

Respectfully submitted,

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(X) CLAIMS APPENDIX

1-28. (Cancelled).

29. (Rejected) An incandescence emitter for incandescence light sources, comprising an emitter body (F) to be brought to incandescence at an operating temperature by means of passage of electric current, the emitter body (F) extending between two electrodes (H), wherein on at least one surface of the emitter body (F) a micro-structure (R) is provided, operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum, wherein

- said micro-structure (R) is at least partly made of a first material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F),

- said electrodes (H) are made of a second material having a high melting point, such as tungsten,

- at least a substantial portion of the emitter body (F), including said micro-structure (R), is coated with a coating layer (OR) made of an oxide with high melting point, such as a refractory oxide, said oxide being configured to preserve a profile of said microstructure (R) in case of melting of the first material (Au), consequent to the use of the emitter body (F) at an operating temperature exceeding the melting temperature of said first material (Au), and

wherein at least one of said emitter body (F), said electrodes (H) and said coating layer (OR) includes one throat or cavity (G) being open on the first material (Au) for receiving part of said first material (Au) in case of melting thereof.

30. (Rejected) An emitter as claimed in claim 29, wherein said throat or cavity (G) is defined in at least one of said electrodes (H), at an interface region thereof between the first material (Au) and the second material.

31. (Rejected) An emitter as claimed in claim 30, wherein the emitter body (F) is almost completely coated by said coating layer (OR) with the exception of respective interface regions between the first material (Au) and the second material of said electrodes (H).

32. (Rejected) An emitter as claimed in claim 29, wherein said throat or cavity (G) is defined in said first layer (OR), at an interface region thereof between the first material (Au) and the oxide.

33. (Rejected) An emitter as claimed in claim 29, wherein said first material (Au) is selected from among conductor, semiconductor and composite materials.

34. (Rejected) An emitter as claimed in claim 29, wherein

- the emitter body (F) is formed by at least a first layer of conductor material (W), melting at higher temperature than the operating temperature of the emitter body (F), such as tungsten, and by a second layer made of the first material (Au), said second layer forming said micro-structure (R), and

- said throat or cavity (G) is defined in said first layer, at an interface region between the conductor material (W) of the first layer and the first material (Au) of the second layer.

35. (Rejected) An emitter as claimed in claim 29, wherein said micro-structure (R) is at least partly formed with a material selected from among gold, silver and copper.

36. (Rejected) An emitter as claimed in claim 29, wherein said a coating layer (OR) is made of a refractory oxide (OR) selected from among ceramic base oxides, thorium, cerium, yttrium, aluminium or zirconium oxide.

37. (Rejected) An emitter as claimed in claim 29, wherein said micro-structure (R) is formed by a superficial micro-structure of the emitter body (F).

38. (Rejected) An emitter as claimed in claim 29, wherein said micro-structure comprises a diffraction grating (R), having at least one of a plurality of micro-projections (R1, R2) and a plurality of micro-cavities (C), where the dimensions (h, D) of the pillar-like micro-projections (R1, R2) or the micro-cavities (C) and the period (P) of the grating (R) are such to

- enhance emission of visible electromagnetic radiation from the first material (Au)), and/or

- reduce emission of infrared electromagnetic radiation from the first material (Au), and/or

- enhance emission of infrared electromagnetic radiation from the first material (Au) to a lesser extent with respect to the increase in visible emissivity.

39. (Rejected) An emitter as claimed in claim 38, wherein said grating (R) is obtained with

- a first layer made of a conductor material (W) melting at higher temperature than the operating temperature of the emitter body (F), the conductor material of the first layer having a structured part,

- a second layer made of the first material (Au), which covers at least the structured part of said first layer, the first material (Au) being selected among conductor, semiconductor or

composite materials,

where the second layer (Au) copies the profile of the structured part of the first layer, to form therewith said grating (R), and the first material (Au) has a greater emission efficiency than the conductor material (W) of the first layer, said efficiency being defined as the ratio between the fraction of visible radiation emitted at the operating temperature in the interval 380 nm - 780 nm and the fraction of radiation emitted at the same temperature in the interval 780 nm - 2300 nm.

40. (Rejected) An emitter as claimed in claim 38, wherein

- said grating (R) is obtained on the surface of a layer (Au) made of the first material (Au),

- said layer made of the first material (Au) is placed on a second conductor material (W) whose melting point is higher than the operating temperature of the emitter body (F),

where the first material (Au) has higher emission efficiency than the second conductor material (W), said efficiency being defined as the ratio between the fraction of visible radiation emitted at the operating temperature in the interval 380 nm – 780 nm and the fraction of radiation emitted at the same temperature in the interval 380 nm – 2300 nm.

41. (Rejected) An emitter as claimed in claim 38, wherein said grating (R) is obtained with

- a first layer of refractory oxide (OR) having a structured part,

- a second layer made of the first material (Au) which covers at least the structured part of the first layer of refractory oxide (OR), the first material (Au) being selected among conductor, semiconductor or composite materials,

where the second layer made of the first material (Au) copies the profile of the structured part of the first layer of refractory oxide (OR), to form therewith said grating (R), and where the second layer made of the first material (Au) is in turn coated by an encapsulating layer constituted by refractory oxide (OR).

42. (Cancelled).

43. (Rejected) An emitter as claimed in claim 38, wherein the periodicity of the micro-projections (R1, R2) or of the micro-cavities (C) is of the order of the wavelength of visible radiation.

44. (Rejected) An emitter as claimed in claim 38, wherein the periodicity of the micro-projections (R1, R2) or of the micro-cavities (C) is between 0.2 and 1 micron.

45. (Rejected) An emitter as claimed in claim 38, wherein the height or depth of the micro-projections (R1, R2) or of the micro-cavities (C) is between 0.2 and 1 micron.

46. (Rejected) An emitter as claimed in claim 29, wherein said micro-structure (R) is binary, i.e. with two levels.

47. (Rejected) An emitter as claimed in claim 29, wherein said micro-structure (R) is multi-level, i.e. it has a projection with more than two levels.

48. (Rejected) An emitter as claimed in claim 29, wherein said micro-structure (R) has a continuous projection.

49. (Rejected) An emitter as claimed in claim 29, wherein it operates at a lower temperature than the melting point of the refractory oxide (OR).

50. (Rejected) An emitter as claimed in claim 29, wherein it is configured as a filament or planar plate structured under the wavelength of visible light, and in that said micro-structure (R) is a two-dimensional grating of absorbing material (k>1).

51. (Rejected) A method for constructing an incandescence light emitter to be brought to incandescence by passage of electric current, comprising the steps of:

a) obtaining a filiform or laminar emitter body (F) to be brought to incandescence at an operating temperature by means of passage of electric current, the emitter body (F) being formed to have on at least one surface thereof a micro-structure (R) operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum, said micro-structure (R) being at least partly made of a first material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F),

b) obtaining a first and a second electrode (H), said electrodes (H) being made of a second material having a high melting point, such as tungsten,

c) connecting each electrode (H) to the emitter body (F), and

d) coating the emitter body (F) in which the anti-reflection micro-structure (R) has been formed with a coating layer (OR) of refractory oxide, said coating layer (OR) being operative to preserve a profile of said microstructure (R) in case of melting of the material (Au) thereof, consequent to the use of the emitter (F) at an operating temperature exceeding the melting temperature of said material (Au),

the method including forming in at least one of said emitter body (F), said electrodes (H) and said coating layer (OR) one throat or cavity (G) open on the first material (Au).

52. (Rejected) A method as claimed in claim 51, wherein

- step b) comprises forming said throat or cavity (G) in at least one of said electrodes (H), and

- step c) comprises connecting said one electrode (H) and said body (F) such that at an interface region between the first material (Au) and the second material said throat or cavity (G) is open on the first material (Au).

53. (Rejected) A method as claimed in claim 51,

wherein step d) comprises forming said throat or cavity (G) in said coating layer (OR) such that at an interface region between the first material (Au) and the refractory oxide said throat or cavity (G) is open on the first material (Au).

54. (Rejected) An incandescent light source, comprising an incandescence light emitter body brought to incandescence by the passage of electric current, wherein said incandescence light emitter body (F) is as claimed in claim 29.

55.-58. (Cancelled).

59. (Rejected) A method as claimed in claim 51, wherein step a) comprises

- forming the emitter body (F) by at least a first layer of conductor material (W), melting at higher temperature than the operating temperature of the emitter body (F), such as tungsten, and by a second layer made of the first material (Au), and

- defining said throat or cavity (G) in said first layer of conductor material (W) such that at an interface region between the first material (Au) and the conductor material (W) said throat or cavity is open on the first material (Au).

60. (Rejected) An incandescence emitter for incandescence light sources, comprising an emitter body (F) to be brought to incandescence at an operating temperature by means of passage of electric current, wherein on at least one surface of the emitter body (F) a micro-structure (R) is provided, operative to enhance absorbance for wavelengths belonging to the visible region of the spectrum, wherein

- said micro-structure (R) is at least partly made of a material (Au) whose melting temperature is lower than the operating temperature of the emitter body (F), and

- at least a substantial portion of the emitter body (F), including said micro-structure (R), is coated with an oxide with high melting point (OR), such as a refractory oxide,

said oxide being configured to preserve a profile of said microstructure (R) in case of melting of the respective material (Au), consequent to the use of the emitter body (F) at an operating temperature exceeding the melting temperature of said material (Au).

(XI) EVIDENCE APPENDIX

Not Applicable.

(XII) RELATED PROCEEDINGS APPENDIX

Not Applicable.